CLAIMS

What is claimed is:

1. A method of specifying a configurable digital system, said method comprising:

in at least one hardware definition language (HDL) file, specifying at least one design entity containing a functional portion of the digital system, said at least one design entity logically containing a configuration latch having a plurality of different possible configuration values that each corresponds to a different configuration of said functional portion of said digital system; and

with a statement in said at least one HDL file, associating a Dial entity with said at least one design entity, said Dial having a Dial input, a Dial output, a mapping table indicating a mapping between each of a plurality of possible input values that can be received at said Dial input and a respective corresponding output value for said Dial output, a default input value among said plurality of possible input values, and a phase ID, wherein said output value controls which of said plurality of different possible configuration values is loaded in said configuration latch and said phase ID indicates a phase during which the default input value is to be applied.

2. The method of Claim 1, wherein:

said Dial entity comprises a Control Dial entity;

said statement comprises a first statement; and

said method further comprising specifying a Dial tree containing a plurality of hierarchically coupled Dial entities including said Control Dial in at least a second statement in said at least one HDL file, wherein a lowest-level Dial entity in said Dial tree directly controls which of said plurality of different possible configuration values is loaded in said configuration latch.

3. The method of Claim 1, wherein said associating a Dial entity comprises associating a Dial entity with said at least one design entity in a configuration specification statement that specifies said Dial.

4. The method of Claim 1, wherein said associating a Dial entity comprises associating a Dial entity with said at least one design entity with a configuration file reference statement referencing a separate configuration file containing a configuration specification statement that specifies said Dial.

5. The method of Claim 1, and further comprising compiling said HDL file to generate a simulation model of said digital system, said simulation model including said design entity and said configuration latch.

6. The method of Claim 5, said compiling further comprising generating a configuration database including at least one data structure defining said Dial entity.

7. The method of Claim 6, and further comprising:

during simulation of said digital system utilizing said simulation model, applying said default input value to one or more selected instances of said Dial entity in accordance with the phase ID in order to determine a latch value for said configuration latch; and

loading said configuration latch in said simulation model with said latch value.

8. A data processing system, comprising:

processing resources; and

data storage including design software, said design software including:

means for specifying, in at least one hardware definition language (HDL) file, at least one design entity containing a functional portion of the digital system, said at least one design entity logically containing a configuration latch having a plurality of different possible configuration values that each corresponds to a different configuration of said functional portion of said digital system; and

means for associating, with a statement in said at least one HDL file, a Dial entity with said at least one design entity, said Dial having a Dial input, a Dial output, a mapping table indicating a mapping between each of a plurality of possible input values that can be received at said Dial input and a respective corresponding output value for said Dial output, a phase ID, and a default input value among said plurality of possible input values, wherein said output value controls which of said plurality of different possible configuration values is loaded in said configuration latch and said phase ID indicates a phase during which the default input value is to be applied.

9. The data processing system of Claim 8, wherein:

said Dial entity comprises a Control Dial;

said statement comprises a first statement; and

said design software further comprising means for specifying a Dial tree containing a plurality of hierarchically coupled Dial entities including said Control Dial in at least a second statement in said at least one HDL file, wherein a lowest-level Dial entity in said Dial tree directly controls which of said plurality of different possible configuration values is loaded in said configuration latch.

10. The data processing system of Claim 8, wherein said means for associating a Dial entity comprises associating a Dial entity with said at least one design entity in a configuration specification statement that specifies said Dial.

11. The data processing system of Claim 8, wherein said means for associating a Dial entity comprises associating a Dial entity with said at least one design entity with a configuration file reference statement referencing a separate configuration file containing a configuration specification statement that specifies said Dial.

12. The data processing system of Claim 8, and further comprising means for compiling said HDL file to generate a simulation model of said digital system, said simulation model including said design entity and said configuration latch.

13. The data processing system of Claim 12, said means for compiling further comprising generating a configuration database including at least one data structure defining said Dial entity.

14. The data processing system of Claim 13, and further comprising:

means for, during simulation of said digital system utilizing said simulation model, applying said default input value to one or more selected instances of said Dial entity in accordance with the phase ID in order to determine a latch value for said configuration latch; and

means for loading said configuration latch in said simulation model with said latch value.

15. A program product, comprising:

a computer usable medium; and

design software within said computer usable medium, said design software including:

means for specifying, in at least one hardware definition language (HDL) file, at least one design entity containing a functional portion of the digital system, said at least one design entity logically containing a configuration latch having a plurality of different possible configuration values that each corresponds to a different configuration of said functional portion of said digital system; and

means for associating, with a statement in said at least one HDL file, a Dial entity with said at least one design entity, said Dial having a Dial input, a Dial output, a mapping table indicating a mapping between each of a plurality of possible input values that can be received at said Dial input and a respective corresponding output value for said Dial output, a phase ID, and a default input value among said plurality of possible input values, wherein said output value controls which of said plurality of different possible configuration values is loaded in said configuration latch and said phase ID indicates a phase during which the default input value is to be applied.

16. The program product of Claim 15, wherein:

said Dial comprises a Control Dial;

said statement comprises a first statement; and

said design software further comprising means for specifying a Dial tree containing a plurality of hierarchically coupled Dials including said Control Dial in at least a second statement in said at least one HDL file, wherein a lowest-level Dial in said Dial tree directly controls which of said plurality of different possible configuration values is loaded in said configuration latch.

17. The program product of Claim 15, wherein said means for associating a Dial entity comprises associating a Dial entity with said at least one design entity in a configuration specification statement that specifies said Dial.

18. The program product of Claim 15, wherein said means for associating a Dial entity comprises associating a Dial entity with said at least one design entity with a configuration file reference statement referencing a separate configuration file containing a configuration specification statement that specifies said Dial.

19. The program product of Claim 15, and further comprising means for compiling said HDL file to generate a simulation model of said digital system, said simulation model including said design entity and said configuration latch.

20. The program product of Claim 19, said means for compiling further comprising generating a configuration database including at least one data structure defining said Dial entity.

21. The program product of Claim 20, and further comprising:

means for, during simulation of said digital system utilizing said simulation model, applying said default input value to one or more selected instances of said Dial entity in accordance with the phase ID in order to determine a latch value for said configuration latch; and

means for loading said configuration latch in said simulation model with said latch value.

22. A method of controlling operation of a digital system, the digital system containing a configuration latch having a plurality of different possible configuration values that each corresponds to a different configuration of a functional portion of said digital system, said method comprising:

establishing a configuration database defining a plurality of instances of a Dial entity, wherein the Dial entity has a Dial input, a Dial output, a mapping table indicating a mapping between each of a plurality of possible input values that can be received at said Dial input and a respective corresponding output value for said Dial output, said output value controlling which of said plurality of different possible configuration values is loaded in said configuration latch, wherein each of said plurality of instances has a respective default input value among said plurality of possible input values and a respective phase ID, wherein said phase ID indicates a phase during which the default input value is to be applied; and

in response to a command specifying one or more phase IDs, applying the default input value of at least one instance having a phase ID matching a phase ID specified by the command; and

in response to the application of the default input value, obtaining an output value of the instance by reference to the mapping table of the Dial entity and setting the configuration latch in the digital system with a configuration value corresponding to the output value.

23. The method of Claim 22, wherein said digital system comprises a hardware system.

24. The method of Claim 22, wherein said digital system comprises a simulated hardware system.

25. A data processing system for controlling operation of a digital system, the digital system containing a configuration latch having a plurality of different possible configuration values that each corresponds to a different configuration of a functional portion of said digital system, said data processing system comprising:

a configuration database defining a plurality of instances of a Dial entity, wherein the Dial entity has a Dial input, a Dial output, a mapping table indicating a mapping between each of a plurality of possible input values that can be received at said Dial input and a respective corresponding output value for said Dial output, said output value controlling which of said plurality of different possible configuration values is loaded in said configuration latch, wherein each of said plurality of instances has a respective default input value among said plurality of possible input values and a respective phase ID, wherein said phase ID indicates a phase during which the default input value is to be applied; and

means, responsive to a command specifying one or more phase IDs, for applying the default input value of at least one instance having a phase ID matching a phase ID specified by the command; and

means, responsive to the application of the default input value, for obtaining an output value of the instance by reference to the mapping table of the Dial entity and for setting the configuration latch in the digital system with a configuration value corresponding to the output value.

26. The data processing system of Claim 25, wherein said digital system comprises a hardware system, and wherein said means for setting the configuration latch comprises means for setting the configuration latch in the hardware system.

27. The data processing system of Claim 25, wherein said digital system comprises a simulated hardware system, and wherein said means for setting the configuration latch comprises means for setting the configuration latch in the simulated hardware system.

28. A program product for controlling operation of a digital system, the digital system containing a configuration latch having a plurality of different possible configuration values that each corresponds to a different configuration of a functional portion of said digital system, said program product comprising a computer usable medium, including:

a configuration database defining a plurality of instances of a Dial entity, wherein the Dial entity has a Dial input, a Dial output, a mapping table indicating a mapping between each of a plurality of possible input values that can be received at said Dial input and a respective corresponding output value for said Dial output, said output value controlling which of said plurality of different possible configuration values is loaded in said configuration latch, wherein each of said plurality of instances has a respective default input value among said plurality of possible input values and a respective phase ID, wherein said phase ID indicates a phase during which the default input value is to be applied;

means, responsive to a command specifying one or more phase IDs, for applying the default input value of at least one instance having a phase ID matching a phase ID specified by the command; and

means, responsive to the application of the default input value, for obtaining an output value of the instance by reference to the mapping table of the Dial entity and for setting the configuration latch in the digital system with a configuration value corresponding to the output value.

29. The program product of Claim 28, wherein said digital system comprises a hardware system, and wherein said means for setting the configuration latch comprises means for setting the configuration latch in the hardware system.

30. The program product of Claim 28, wherein said digital system comprises a simulated hardware system, and wherein said means for setting the configuration latch comprises means for setting the configuration latch in the simulated hardware system.